Zebra

When it's on the line.™

PA400
PT400

PORTABLE PRINTERS

User's
Guide

When it's on the line.™

*PA4*00
*PT4*00

PORTABLE PRINTERS

Customer order #52600L
Manufacturer part #52600LB Rev. 1

User's
Guide

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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and the receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
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NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.

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I have determined that the Zebra printers identified as the

Zebra® Portable Line™
*PA*400 and *PT*400

manufactured by:

Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109 U.S.A.

have been shown to comply with the applicable technical standards of the FCC

for Home, Office, Commercial, and Industrial use

if no unauthorized change is made in the equipment,
and if the equipment is properly maintained and operated.

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Introduction

Hello!

Thank you for choosing our Zebra Portable Printer. Don't let its size fool you - this rugged little printer is sure to become a productive and efficient addition to your workplace. And it's no wonder, because it's made by Zebra Technologies Corporation - your number one source for bar code printers, software, and supplies!

- This user's guide gives you all the information you'll need to operate the printer.
- To create and print label formats, take a look at the *ZPL II Programming Guide* (part #46530L) for information about Zebra's label design programming language, better known as "ZPL II." If one was not ordered with your printer, simply call your reseller or Zebra Technologies Corporation *or* visit the Zebra web site. If you'd like to use a different label preparation software, contact your reseller or Zebra for advice and information.
- The *PA400/PT400 Maintenance Manual* (part #505142L) contains all the information you'll need to properly maintain the printer.

Unpacking and Inspection

Inspect the printer for possible shipping damage:

- Check all exterior surfaces for damage.
- Raise the media access door (refer to "Loading the Media" in *Getting Ready to Print*) and inspect the media compartment for damage.

In case shipping is required, save the carton and all packing material.

Reporting Damage

If you discover shipping damage:

- Immediately notify and file a damage report with the shipping company. *Zebra Technologies Corporation is not responsible for any damage incurred during shipment of the printer and will not cover the repair of this damage under its warranty policy.*
- Keep the carton and all packing material for inspection.
- Notify your authorized Zebra reseller.
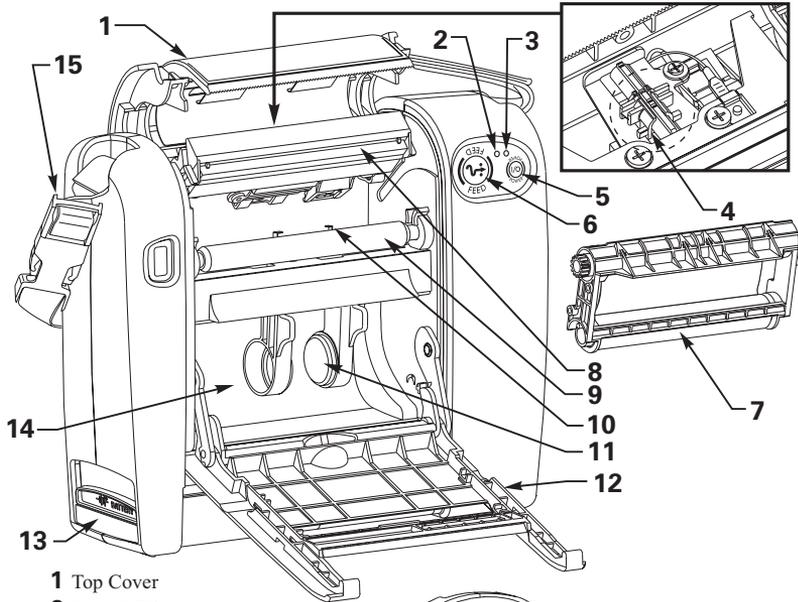
1 Top Cover
2 Error LED
3 Power LED
4 Printhead Pressure Adjuster
5 Power Button
6 Feed Button
7 Ribbon Cartridge
8 Printhead
9 Platen Roller
10 Media Guides
11 Media Hangers
12 Media Access Door
13 Battery Compartment
14 Media Compartment
15 Strap
16 Communications Port
17 Battery Charging Receptacle
18 Battery Charging LED
19 Charging Station Connector
20 Peel Bar
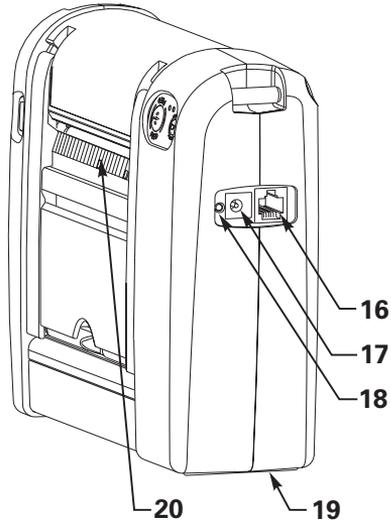
Figure 1

Getting Ready to Print

Battery

Installing the Battery

☀ *NOTE: Batteries are shipped uncharged.*

1. Slide up the battery compartment door.
2. Insert the battery into the printer as shown in Figure 2, with the silver-colored battery contacts facing up.
3. After the battery is completely inserted, slide down the battery compartment door.

When the battery is first installed, the Power and Error LEDs will light for approximately two seconds and then go off. If these lights do not go on, the battery is not fully charged (see "Charging the Battery").

Battery Compartment Door
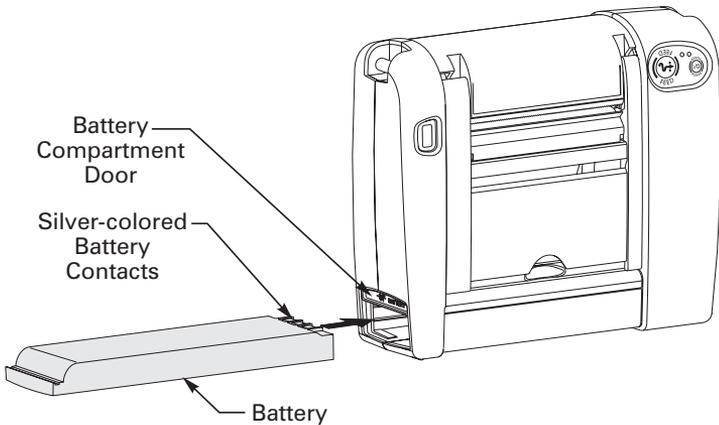
Silver-colored Battery Contacts

Battery

Figure 2

Charging the Battery

Refer to Figure 3 (your battery charger may look slightly different than the ones illustrated).

If you are using a 120 VAC battery charger:

1. With the battery installed in the printer, insert the connector of the battery charger into the receptacle on the side of the printer.
2. Plug the battery charger into an appropriate 120 VAC electrical outlet.
3. The battery charging LED will briefly flash and then stay on. When the battery is fully charged (approximately one hour for the standard battery; two hours for the extended life battery), the light will go off.
4. You may either remove the battery charger from the printer *or* leave it connected for a continuous maintenance charge.

If you are using a universal battery charger:

1. With the battery installed in the printer, insert the connector of the battery charger into the receptacle on the side of the printer.
2. Make sure the supplied power cord is inserted in the battery charger.
3. Plug the other end of the cord into an appropriate AC electrical outlet.
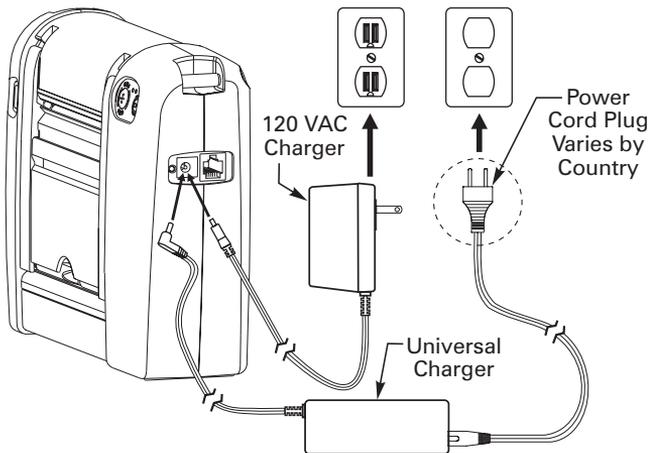
Figure 3

4. The battery charging LED will briefly flash and then stay on. When the battery is fully charged (approximately one hour for the standard battery; two hours for the extended life battery), the light will go off.

5. You may either remove the battery charger from the printer *or* leave it connected for a continuous maintenance charge.

Loading the Media

You can operate this printer in one of two different modes: Tear-Off or Peel-Off. Tear-Off mode allows you to tear off each label (or a strip of labels) after it is printed. In Peel-Off mode, the backing material is peeled away from the label as it is printed. After you remove this label, the next one is printed.

Tear-Off Mode

NOTE: If ribbon is loaded (PT400 only), remove the ribbon cartridge before loading the media.

1. Refer to Figure 4. Raise the media access door by lifting at the notch until it unhooks from the top cover.
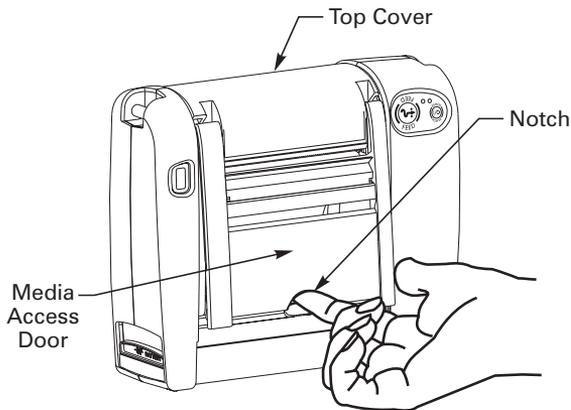
Figure 4

2. Refer to Figure 5. Swing the media access door open to expose the media compartment.

3. Pivot the top cover to reveal the printhead.

4. Lift the printhead until you feel it "lock" into place. Be careful not to force the printhead past this position!

> **WARNING: NEVER touch the thermal print elements on the underside of the printhead. Under certain conditions, they can be very hot! Also, dirt or moisture from your hands can damage the printhead!**
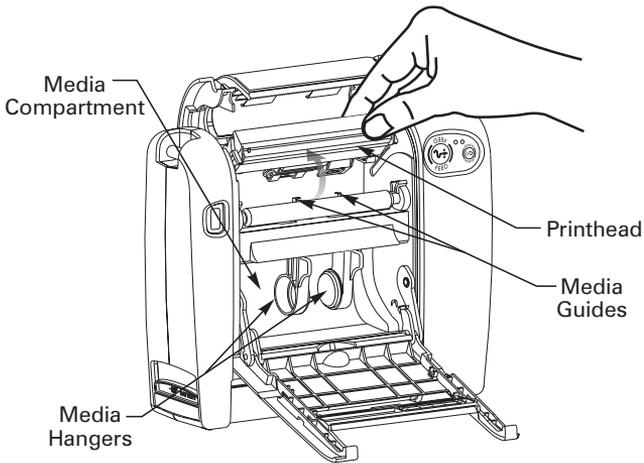
Figure 5

5. Refer to Figures 5 and 6. Thread the media into the printer until it extends approximately 1" (25.4 mm) past the printhead.

6. Separate and hold open the media hangers.

7. Place the media roll onto the media hangers, making sure it is tightly wound.

8. Release the media hangers so the media locks into the correct position. Make sure the media is threaded under both media guides.
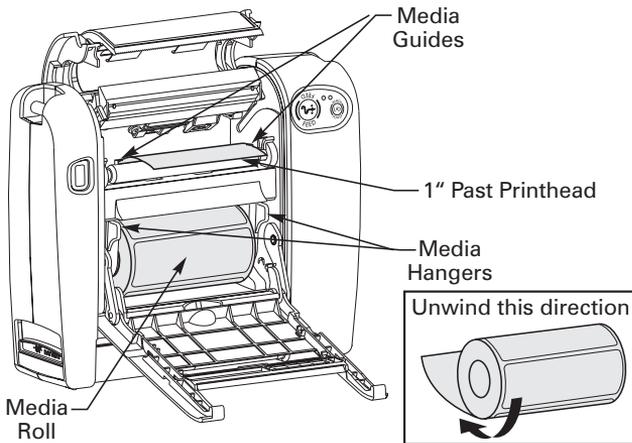
Figure 6

9. Refer to Figure 7. If it's not already in place, install the tear bar in the media access door. Gently lift the tab on the bar to move it over the protrusion on the door. Make sure the lip of the bar (inset, Figure 7) faces out of the printer.

If you're using direct thermal media, continue on with step 10. However, if you're using thermal transfer media, you must also install a ribbon cartridge. Proceed to *"Loading the Ribbon"* in this chapter.

10. Close the printhead and the top cover.
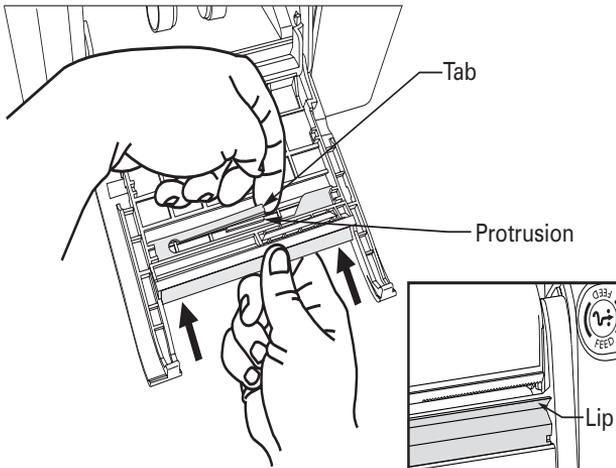
Figure 7

11. Swing up the media access door, ensuring that the media extends over the tear bar (refer to Figure 8).

12. Lift to hook the top of the media access door over the top cover.

13. Push in the bottom of the media access door to close.

14. Turn on the printer *or* press the Feed button if the printer is already on.

Tear Bar
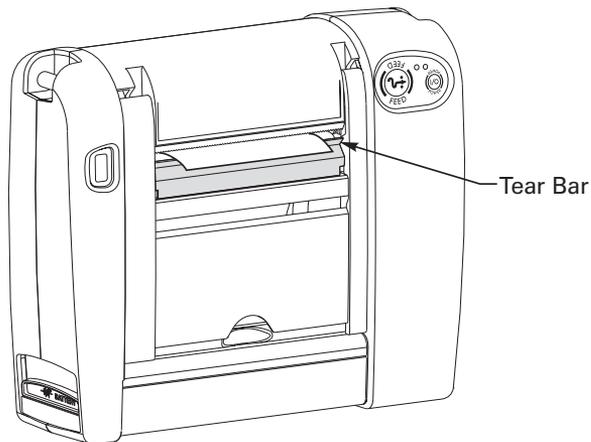
Figure 8

Peel-Off Mode

NOTES: Your authorized Zebra reseller can recommend the correct ribbon and peel-off media for your application.

If ribbon is loaded (PT400 only), remove the ribbon cartridge before loading the media.

1. Refer to Figure 4. Raise the media access door by lifting at the notch until it unhooks from the top cover.

2. Refer to Figure 5. Swing the media access door open to expose the media compartment.

3. Pivot the top cover to reveal the printhead.

4. Lift the printhead until you feel it "lock" into place. Use caution not to force the printhead past this position!

   WARNING: NEVER touch the thermal print elements on the underside of the printhead. Under certain conditions, they can be very hot! Also, dirt or moisture from your hands can damage the printhead!

5. Refer to Figures 5 and 6. Remove approximately 6" (152.4 mm) of labels from the media roll. Then, thread the media into the printer until it extends approximately 1" (25.4 mm) past the printhead.

6. Separate and hold open the media hangers.

7. Place the media roll onto the media hangers, making sure it is tightly wound.

8. Release the media hangers to lock the media into the correct position. Ensure that the media is threaded under both media guides.

9. The tear bar should *not* be installed in the printer. If it is, gently lift the tab on the bar to get it over the protrusion on the door (reverse the procedure shown in Figure 7). Then, pull the bar out of the printer.

NOTE: When not in use, the tear bar may be stored on the inside of the media access door. Refer to Figure 9. With the lip of the bar facing the inside of the door, simply align the notches of the bar with the tabs on the door. Press and slide the bar toward the door's hinged end.

If you're using direct thermal media, continue on with step 10. However, if you're using thermal transfer media, you must also install a ribbon cartridge. Proceed to *"Loading the Ribbon"* in this chapter.
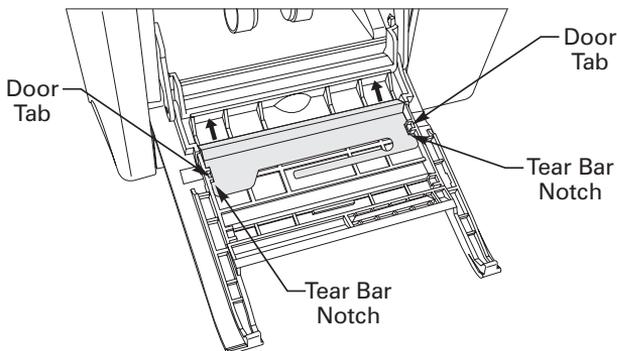
Figure 9

10. Close the printhead and the top cover.

11. Swing up the media access door, ensuring that the media liner is threaded through the wide slot in the media access door (refer to Figure 10).

12. Lift to hook the top of the media access door over the top cover.

13. Push in the bottom of the media access door to close.

14. Turn on the printer *or* press the Feed button if the printer is already on.

> ☀ *NOTES: To ensure optimal print quality, make sure that the backing material is flush against the peel bar (as shown in Figure 10).   If it starts to "loop" away from the peel bar, gently pull down on the backing material.*
>
> *With certain types of media, it may be necessary to reduce the print speed to 1.5" (38.1 mm) per second to produce consistent peel operation.   Consult your authorized Zebra reseller for advice and information.*

Label

Backing Material

Wide Slot
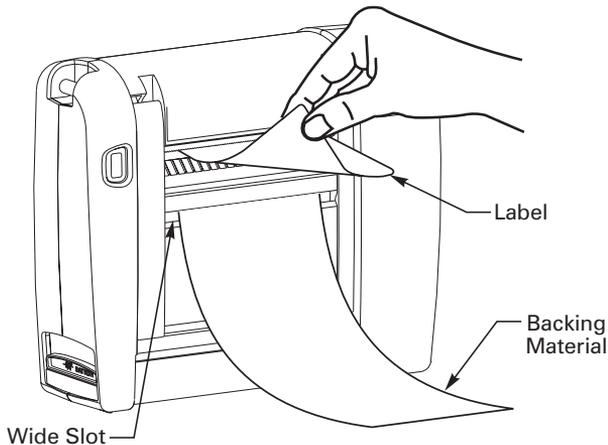
Figure 10

Fanfold Media (optional vibration mount required)

NOTE: If ribbon is loaded (PT400 only), remove the ribbon cartridge before loading the media.

1. Raise the media access door by lifting at the notch until it unhooks from the top cover (refer to Figure 4).

2. Swing the media access door open to expose the media compartment (refer to Figure 5).

3. Pivot the top cover to reveal the printhead.

4. Lift the printhead until you feel it "lock" into place. Be careful not to force the printhead past this position!

   WARNING: NEVER touch the thermal print elements on the underside of the printhead. Under certain conditions, they can be very hot! Also, dirt or moisture from your hands can damage the printhead!

5. Separate and hold open the media hangers (refer to Figure 11).

6. Place the plastic media core (refer to Figure 11) onto the media hangers.

Figure 11

13

7. Release the media hangers so the plastic media core locks into the correct position.

8. Place the fanfold media in the fanfold media tray.

9. Swing up the media access door. Thread the fanfold media through the slot beneath the notch on the media access door (refer to Figure 12).

10. Swing open the media access door. Continue to insert the media into the printer and under the plastic media core until it appears beneath the printhead. Make sure the media is threaded under both media guides.

If you're using direct thermal media, continue on with step 11. However, if you're using thermal transfer media, you must also install a ribbon cartridge. Proceed to *"Loading the Ribbon"* in this chapter.

11. Swing up the media access door, ensuring that the media extends over the tear bar (refer to Figure 13).

12. Lift to hook the top of the media access door over the top cover.

13. Push in the bottom of the media access door to close.

14. Turn on the printer *or* press the Feed button if the printer is already on.

Notch

Fanfold
Media

Slot

Figure 12

Media

Figure 13

Loading the Ribbon (PT400 only)

1. If the printhead is not already open, lift it until you feel it "lock" into place.

    WARNING: NEVER touch the thermal print elements on the underside of the printhead. Under certain conditions, they can be very hot! Also, dirt or moisture from your hands can damage the printhead!

2. Hold the ribbon cartridge as shown in Figure 14. The placement arrows should be visible and pointing toward the back of the printer.

3. Align the lower protrusions on both sides of the ribbon cartridge with the channels in the left and right frames (refer to Figure 14).

4. Slide the ribbon cartridge past the printhead (refer to Figure 15). It will automatically move into the correct operating position.

5. Close the printhead (refer to Figure 16) and the top cover. Swing up the media access door, ensuring that the media is properly extending out of the printer (see Figure 8 for Tear-Off, or Figure 10 for Peel-Off).

6. Lift to hook the top of the media access door over the top cover. Push in the bottom of the media access door to close.

7. Turn on the printer *or* press the Feed button if the printer is already on.

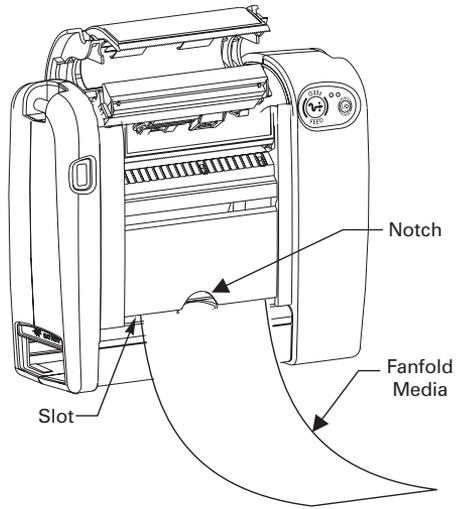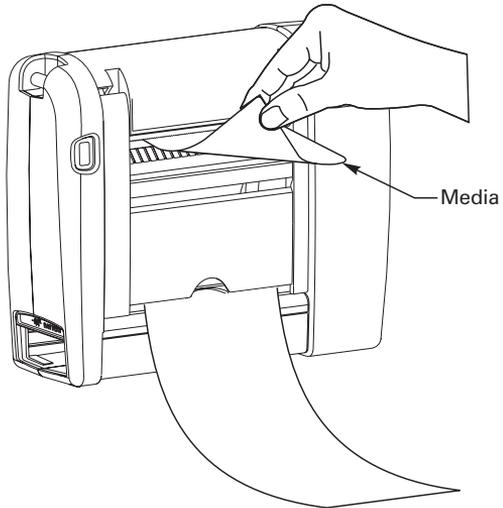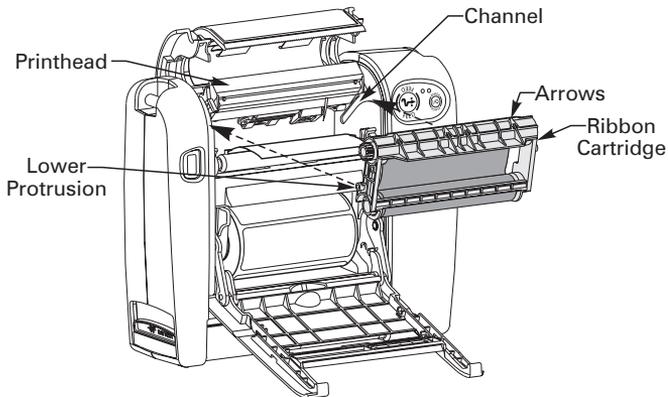**Figure 14**

To remove the ribbon cartridge, simply lift the printhead and pull the ribbon cartridge from the printer.

Printhead ⎯

Ribbon Cartridge

Figure 15

Close Printhead

Ribbon
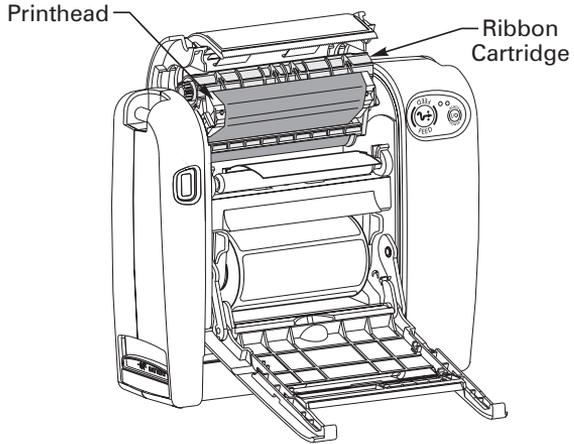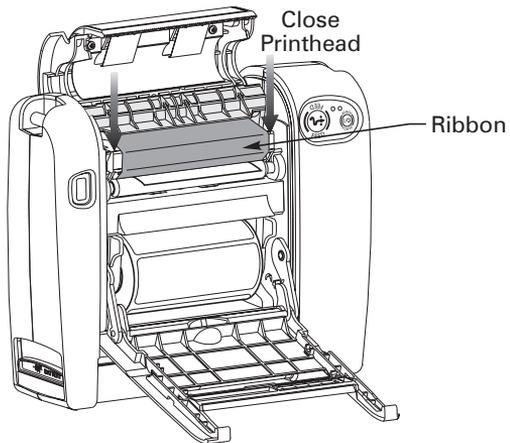
Figure 16

Operator Controls

Refer to Figure 17.

Power Button

- Press to turn on the printer.
- To turn off the printer, press and hold until the Power LED flashes once. (Holding the button for approximately two seconds acts as a safeguard. That way, no data will be lost if the button is accidentally pressed or bumped.)

> *CAUTION: The power should be turned off before connecting or disconnecting the communications cable.*

Feed Button

- Forces the printer to feed one blank label.
- Takes the printer out of a "pause" condition. (The printer is put into "pause" by either a software command or an error condition.) See *Troubleshooting*.
- Used for printer setup and status (see "Feed Button Modes" in *Troubleshooting*).
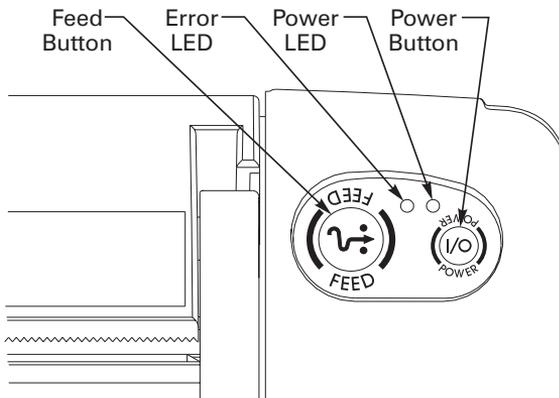
Figure 17

Indicator LEDs

Refer to Figures 17 and 18.

Power LED (Green)

- "On" during normal printer operation.
- Functions as a printer operational/battery status indicator (see "Help! The LEDs are On/Off/Flashing!" in *Troubleshooting*).

Error LED (Orange)

- "Off" during normal printer operation.
- Functions as a printer operational status indicator (see "Help! The LEDs are On/Off/Flashing!" in *Troubleshooting*).

Battery Charging LED (Yellow)

- Functions as a battery charging status indicator.
- "On" while the battery is fast charging.
- "Flashing" when the printer is preparing the battery for fast charging *or* the battery overheats while charging.
- "Off" if the battery is fully charged *or* the battery charger is not plugged in.

Receptacle

Battery Charging LED
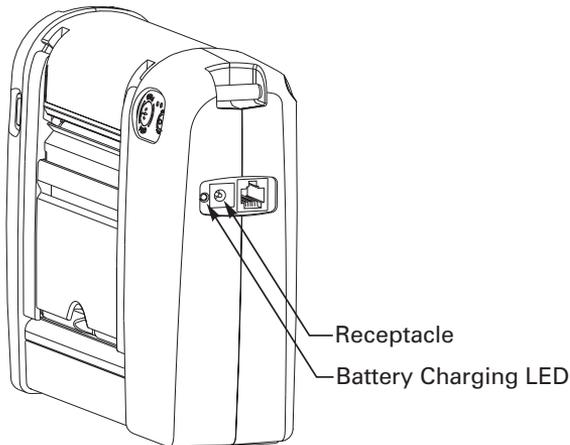
Figure 18

Printing a Test Label

Before you connect the printer to your computer or portable data terminal, make sure that the printer is in proper working order. You can do this by printing a configuration label (refer to "Feed Button Modes" in *Troubleshooting*). If you can't get this label to print, refer to *Troubleshooting*.

Connecting the Printer and Computer

CAUTION: The power should be turned off before connecting or disconnecting the communications cable.

This printer is configured as Data Terminal Equipment (DTE). There are two types of cables available for the printer.

The straight through printer adapter cable connects to a null modem cable, which connects to the computer or a portable data terminal (PDT). Consult your computer/PDT reseller for the appropriate DB-9 null modem cable for your device.

Refer to Figure 19.

1. Plug the null modem cable into the serial data port of the computer.

2. Plug the other end of the null modem cable into the connector of the printer adapter cable.

    NOTE: The adapter cable maintains interface compatability with the full line of Zebra printers.

3. Plug the adapter cable into the printer's communications port (see Figure 1).

Null modem cables are also available for many popular portable data terminal models. Consult your authorized Zebra reseller for available data cables.

Refer to Figure 20.

1. Turn off the portable data terminal and the printer.

2. Plug the communications cable into the communications port of both the portable data terminal and the printer. **A ferrite is built into the cable near the connector that plugs into the printer**.

3. Turn on the portable data terminal and the printer.

For pinout and cabling information, refer to *Specifications*.

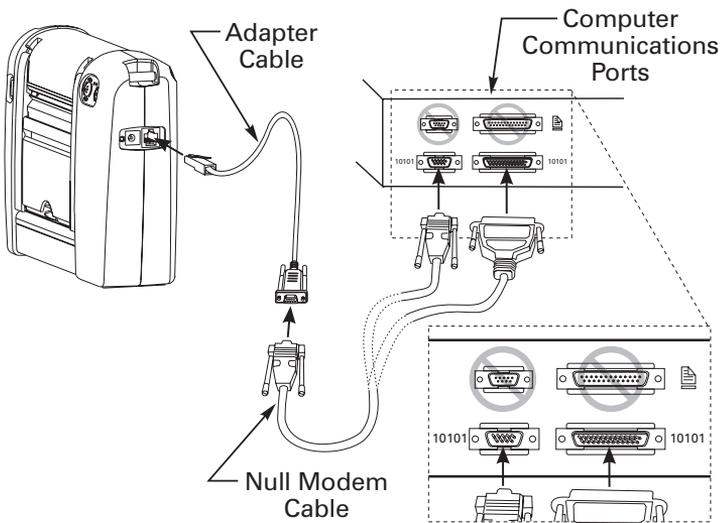Adapter Cable

Computer Communications Ports

Null Modem Cable

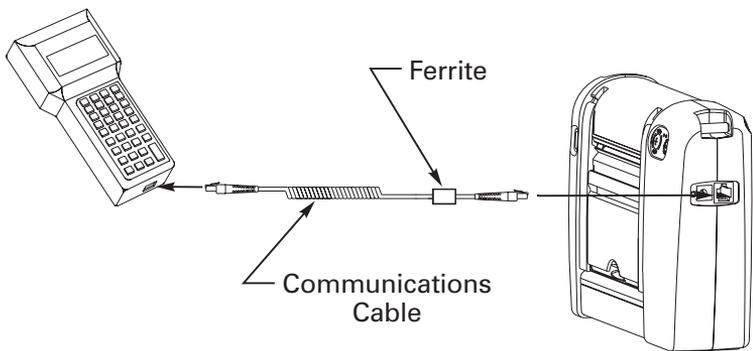**Figure 19**

Ferrite

Communications Cable

Figure 20

Communicating with the Printer

Setting the Communication Parameters

When using the printer's serial port to transfer data, you will need to make sure that the printer and the computer have identical communication parameter settings. To initialize the communication parameters for the printer:

• Press and hold the Feed button until the Error LED flashes once, then twice, then three times. Release the button. The baud rate for the printer will be reset to 9600 baud, 8 bits per character, no parity, and 1 stop bit using software handshaking (XON/XOFF). Then, set the communication parameters on your computer to match this.

• Some computer programs use different settings than the default modes (for example, computers operating in MS-DOS use hardware handshaking instead of XON/XOFF). To use different settings than the defaults and save these settings permanently, refer to your label preparation software user's manual.

Setting Up the Software

In order to create labels, you must decide whether you will use ZPL II or a commercial label preparation system. To use ZPL II, refer to the *ZPL II Programming Guide*. If you choose to use a label preparation system, follow the installation instructions included in the package.

Adjusting the Print Width

Print width must be calibrated when you are using the printer for the first time *and* whenever there is a change in the width of the media you are using. Print width can be set via the software (consult your label preparation software user's manual) *or* refer to "Feed Button Modes" in *Troubleshooting*.

Adjusting the Print Darkness

The relative darkness setting is software controlled. Follow the instructions in your label preparation software user's manual.

Adjusting the Printhead Pressure

Adjust printhead pressure if print darkness is inconsistent across the label.

NOTE: In general, use a higher setting for wide labels and a lower setting for narrow labels.

There are four printhead pressure settings (see Figure 21). Depending on whether you want to increase or decrease the printhead pressure, slide the printhead pressure adjuster toward the back or front of the printer. Then, print another test label. Repeat this procedure until you achieve the desired results.

WARNING: NEVER tighten or loosen the two screws that secure the printhead to the bracket! They are not used to adjust printhead pressure!

Printhead Pressure Adjuster

Highest Pressure Setting

Lowest Pressure Setting

Screws Securing Printhead to the Bracket
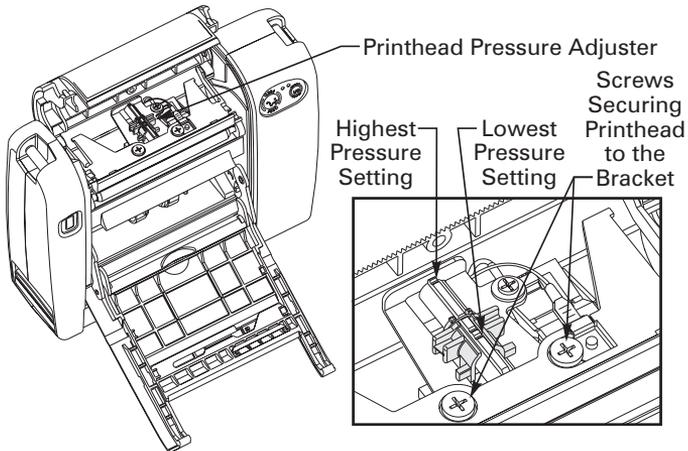
Figure 21

Adjusting the Strap

Hand/Shoulder Strap

To lengthen the strap:

Refer to Figure 22.

1. With the printer in front of you, unwrap the padded handle by lifting up the loose end of the handle.

2. Unlatch the buckle by squeezing both sides of the fastener.

3. Let the loose end of the strap fall to the side.

4. Pull up the handle.
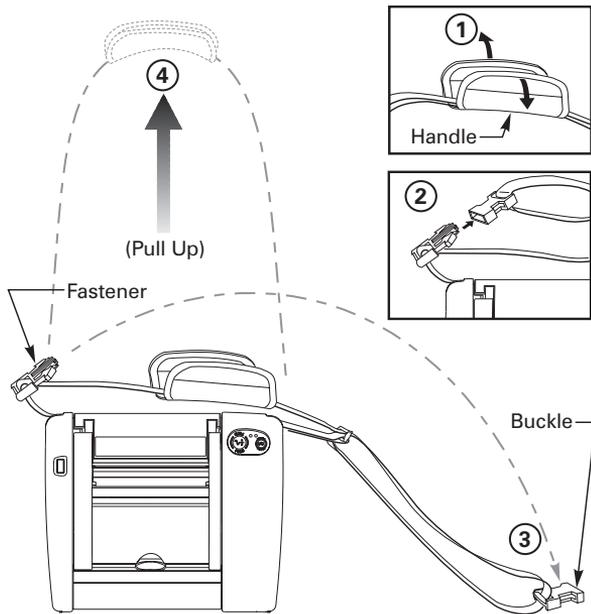
Figure 22

To shorten the strap:

Refer to Figure 23.

1. Pull the buckle until the strap is taut.
2. Latch by inserting the fastener into the buckle.
3. Wrap and secure the padded handle around the strap.
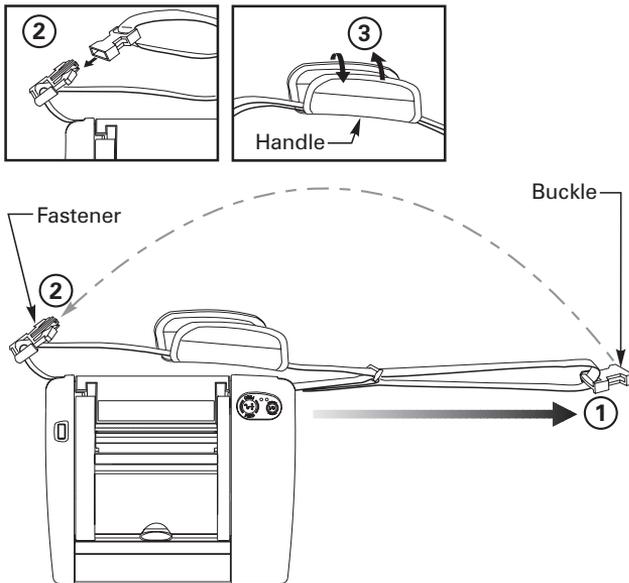
Figure 23

Adjustable Shoulder Strap

Refer to Figure 24.

Slide the two buckles toward either the printer or shoulder pad until you achieve the desired length.

Grip Buckle Here

Shoulder Pad

Pull Strap Here to Shorten

Pull Strap Here to Lengthen
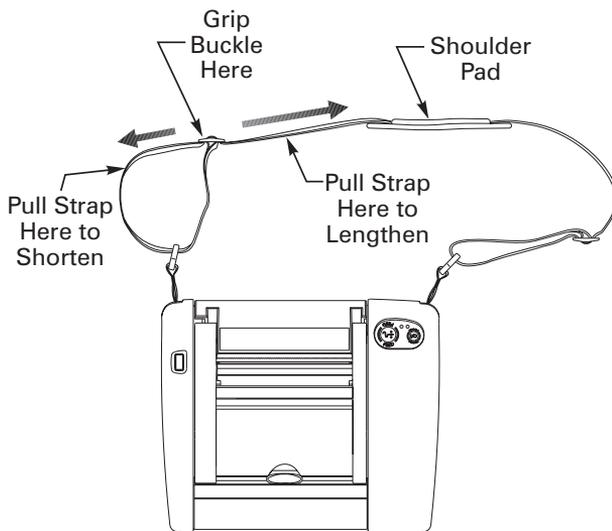
Figure 24

Calibration

Auto Calibration

NOTE: The printer will not auto calibrate when you are using pre-printed labels or pre-printed label backing. If you are using this type of media, see "Manual Calibration."

By default, this printer automatically sets the sensor levels for, and determines the length of, the label you are using. To auto calibrate:

1. Load the media according to the instructions in "Loading the Media" in *Getting Ready to Print*.

2. Turn on the printer *or* press the Feed button if the printer is already on.

3. Some blank labels will feed, completing auto calibration.

4. If the Error LED begins flashing, refer to "Manual Calibration."

Hints:

• Auto calibration only works when you are using non-continuous media (a gap, notch, or black mark separates each label).

• When auto calibration is selected, it occurs when the printer is turned on (if the printhead has been opened), whenever an error is cleared, or if the battery (or other power source) has been removed.

Manual Calibration

A manual calibration should be performed whenever you are using pre-printed labels (or label backing) *or* if the printer will not auto calibrate.

1. Turn on the printer power.

2. Remove 4-6" (102-152 mm) of labels from a section of backing material. Load the media so that only the backing material is threaded through the printer and under the printhead.

3. Press and hold the Feed button until the Error LED flashes once, then twice. Release the button.

4. The printer will set the media sensor for the label backing you are using. After it is done making this adjustment, the roll will automatically feed until a label is positioned at the printhead.

5. A profile of the media sensor settings will print (similar to the example in Figure 25). Upon completion, the printer will save the new settings in memory and the printer is ready for normal operation.

6. Press the Feed button. One entire blank label should feed. If this doesn't happen, try defaulting (refer to "Feed Button Modes" in *Troubleshooting*) and recalibrating the printer.

> *NOTE:* *Performing a manual calibration disables the auto calibration function. To return to auto calibration, either default the printer (see "Feed Button Modes" in Troubleshooting) or refer to your label preparation software user's manual.*

> *NOTE:* *When using non-continuous media, set the appropriate software command (see your label preparation software user's manual) before you perform a manual calibration.*
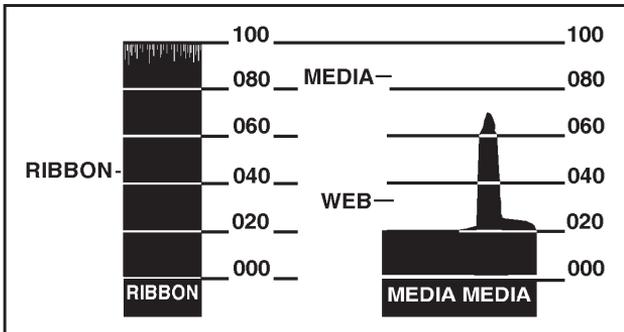

Figure 25

Preventive Maintenance

> **WARNING: To avoid possible personal injury or damage to the printer, never insert any pointed or sharp objects into the printer.**

Cleaning

> *CAUTION: Use only the cleaning agents indicated. Zebra Technologies Corporation will not be responsible for damage caused by any other cleaning materials used on this printer.*

Area	Method	Interval
Printhead (Figure 1)	Use 70% isopropyl alcohol on a cotton swab to clean the print elements from end to end (the print elements are located in the thin gray line on the printhead). **Note:** You do not have to turn off the printer to do this. *If print quality has not improved after performing this procedure, try cleaning the printhead with Save-a-Printhead cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller for more information.*	After every five rolls of media or three ribbon cartridges (or more often, if needed)
Platen roller (Figure 1)	With the printer turned off, rotate the platen roller and clean it thoroughly with 70% isopropyl alcohol and a cotton swab or lint-free cloth.	
Head open sensor plate (Figure 26)	With the printer power turned off and battery removed, press down on the top of the printhead. Then, clean the area beneath the screw with 70% isopropyl alcohol and a cotton swab. **Caution: Do not turn the screw.**	
Peel bar (Figure 1)	Clean it thoroughly with 70% isopropyl alcohol and a cotton swab.	As needed
Tear bar (Figure 8)	Clean it thoroughly with 70% isopropyl alcohol and a cotton swab.	As needed
Exterior	Water-dampened cloth	As needed
Interior	Brush/air blow	As needed

PRESS DOWN

Head Open Sensor Plate

Clean under screw
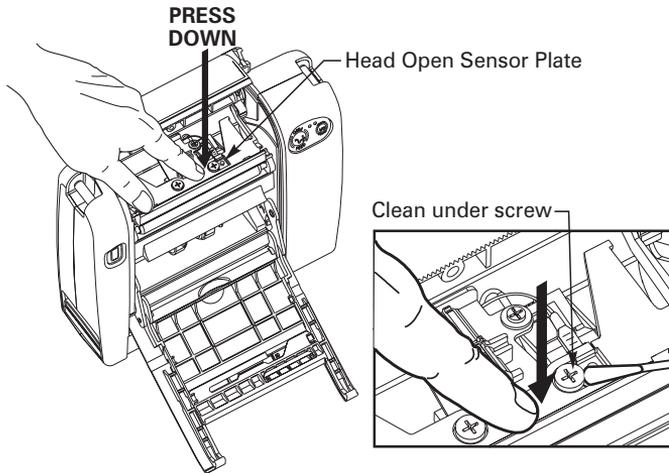
Figure 26

Lubrication

CAUTION: No lubricating agents of any kind should be used on this printer! Some commercially available lubricants, if used, will damage the finish and the mechanical parts inside the printer.

Extending Battery Life

• Never expose the battery to direct sunlight or temperatures over 104° F (40° C).

• Choose the media or ribbon that is easiest to "burn." An authorized Zebra reseller can help you determine this.

• Make sure you're using the optimal ribbon/media combination for your application. An authorized Zebra reseller can help you determine this.

• If you print the same text or graphic on every label, consider using a pre-printed label.

• Choose the correct print darkness, print speed, and printhead pressure for your media and ribbon.

• Use software handshaking (XON/XOFF) whenever possible.

- Select Tear-Off mode whenever possible (Peel-Off mode uses more power).
- Pull the battery out of the printer if the printer won't be used for a day or more *and* you're not performing a maintenance charge.
- Completely discharge the battery before recharging. Wait until you get a "battery under voltage - level 1" indication (Error LED off and Power LED flashing) *before* you recharge.
- Consider purchasing an extended life battery, which offers double the life of a standard battery.

Battery Disposal

The EPA certified RBRC® Battery Recycling Seal on the nickel-cadmium (Ni-Cd) battery indicates Zebra Technologies Corporation is voluntarily participating in an industry program to collect and recycle these batteries at the end of their useful life, when taken out of service in the United States or Canada. The RBRC® program provides a convenient alternative to placing used Ni-Cd batteries into the trash or the municipal waste stream, which may be illegal in your area. Please call 1-800-8-BATTERY™ for information on Ni-Cd battery recycling and disposal bans/restrictions in your area. Zebra Technologies Corporation's involvement in this program is part of our commitment to preserving our environment and conserving our natural resources.

Outside North America, please follow local battery recycling guidelines.

Troubleshooting

Try as you may, you can't seem to get the label to look right. Or, the LEDs are on or flashing when they're normally off. This is the section of the User's Guide that can help you solve your printer's problems! If, after reading this section, you're still having difficulty getting your printer to print, contact a qualified Zebra service technician.

Help! The LEDs are On/Off/Flashing!

Error LED (Orange)	Power LED (Green)	Printer Status	For a Resolution, Refer to:
Off	Off	Off	1
Flashing	On	Stopped	2
Double Flashing	On	Paused	3
On	On	On	4
On	On	Stopped	5
Off	Flashing	On	6
Off	Flashing	Stopped	7
Alternate Flashing		Needs Service	8
Simultaneous Flashing		Various	2 *and* 6
On	Flashing	On	4 *and* 6
On	Flashing	Various	5 *and* 6
Double Flashing	Flashing	Yes	3 *and* 7

Resolutions:

1. The printer is not receiving power.

- Have you turned on the printer power?
- Ensure that the battery is fully charged. Follow the instructions in "Charging the Battery" in *Getting Ready to Print*.
- Make sure the battery is properly installed. Refer to "Installing the Battery" in *Getting Ready to Print*.

2. The printhead is open.

- Close the top cover and media access door. Then, press the Feed button to resume printing.

   The media is out.

- Load a roll of media, following the instructions in "Loading the Media" in *Getting Ready to Print*. Then, press the Feed button to resume priting.

   The ribbon is out (PT400 only).

- Load the ribbon, following the instructions in "Loading the Ribbon" in *Getting Ready to Print*. Then, press the Feed button to resume printing.

   The head open sensor plate is dirty.

- Clean the head open sensor plate according to the instructions in *Preventive Maintenance*.

3. The printer is paused.

- Press the Feed button to resume printing.

4. The printhead is under temperature.

- Continue printing while the printhead reaches the correct operating temperature.

5. The printhead is over temperature.

- Printing automatically stops until the printhead cools to an acceptable printing temperature; then, the printer automatically resumes operation.

   The battery is over temperature.

- Printing automatically stops until the printer and battery cool to an acceptable operating temperature; then, the printer automatically resumes operation.

6. The battery is under voltage (level 1).

- Wait until the current label finishes printing, then plug the battery charger into the printer (you don't have to turn off the printer to do this).

7. The battery is under voltage (level 2).

• The battery may not have enough power to print the next label and can reset the printer, losing formats in the printer. Plug the battery charger into the printer (you don't have to turn off the printer to do this). After the battery is charged, press the Feed button.

8. FLASH memory is not programmed.

• Return the printer to an authorized Zebra reseller.

Print Quality Problems

No print on the label.

• If you aren't using ribbon, make sure the correct media (direct thermal) is loaded. Try this: Quickly rub your nail or a blunt object over the label surface. If it doesn't produce dark marks, the wrong media (thermal transfer) is loaded.

• Are the media and ribbon loaded correctly? Follow the instructions in "Loading the Media" and "Loading the Ribbon" in *Getting Ready to Print*.

• You may be trying to use the printer outside of its environmental limits. The correct operating temperature range for this printer is between 32° F and 104° F (0° to 40° C).

The printed image doesn't look right.

• The printhead is dirty. Clean the printhead according to the instructions in *Preventive Maintenance*.

• Printhead pressure needs to be adjusted. Follow the steps in "Adjusting the Printhead Pressure" in *Getting Ready to Print.*

• The print darkness needs to be adjusted. See "Adjusting the Print Darkness" in *Getting Ready to Print*.

• The print mode may be incompatible with the media you are using. If your printer is set for thermal transfer mode, you *must* use thermal transfer, rather than direct thermal, media *and* a ribbon cartridge.

• The media being used is incompatible with the printer. Be sure to use the Zebra-recommended media for your application.

• Battery voltage is low. See "Charging the Battery" in *Getting Ready to Print*.

There are long tracks of missing print (blank vertical lines) on several labels.

- The printhead is dirty. Clean the printhead according to the instructions in *Preventive Maintenance*.

- The printhead elements are damaged. Call a qualified service technician to replace the printhead.

Misregistration of labels (the printing does not start at the top of the label) and misprinting of 1 to 3 labels.

- The media may not be threaded under the media guides. Refer to "Loading the Media" in *Getting Ready to Print*.

- The printer needs to be calibrated. Refer to *Calibration*.

- Printhead pressure needs to be adjusted. Follow the instructions in "Adjusting the Printhead Pressure" in *Getting Ready to Print*.

- The correct media sensor may not be activated. In manual calibration, select the media sensing method for the labels you are using (refer to your label preparation software user's manual).

A label format was sent to, but not recognized by, the printer.

- Is the printer in pause mode? If so, press the Feed button.

- If the LEDs are on or flashing, refer to "Help! The LEDs are On/Off/Flashing!" in *Troubleshooting*.

- Make sure the data cable is installed correctly. Also, make sure you are using a null modem cable between the printer's adapter cable and the computer (see Figure 19), or the appropriate null modem cable.

- A communications problem has occurred. First, make sure that the correct communications port on the computer is selected. Next, verify that the same handshaking is in use by both the printer and the computer. Then, ensure that the communication parameters of the printer and the computer match. Refer to "Communicating with the Printer" in *Getting Ready to Print*.

Troubleshooting Tests

Printing a Configuration Label

To print out a listing of the printer's current configuration (a sample is shown in Figure 27), refer to "Feed Button Modes" in this chapter.

Recalibration

Recalibrate the printer if it starts to display unusual symptoms, such as skipping labels. See *Calibration*.

Resetting the Factory Default Values

Sometimes, resetting the printer to the factory defaults solves some printer problems. Follow the instructions in "Feed Button Modes" in this chapter.

Communications Diagnostics

If there's a problem transferring data between the computer and printer, try putting the printer in the Communications Diagnostics mode. The printer will print the ASCII characters and their respective hexidecimal values for any data received from the host computer (see Figure 28). To find out how, refer to "Feed Button Modes" in this chapter.

```
        Printer Configuration
10.................. Darkness
-25................. Tear Off Adjust
059................. Web Sensor
085................. Media Sensor
063................. Ribbon Sensor
080................. Mark Media Sensor
050................. Mark Sensor
070................. Media Led
100................. Ribbon Led
255................. Mark Led
1225................ Label Length
10.00IN   253MM..... Max Label Length
 4.09IN   104MM..... Print Width
Tear Off............ Print Mode
Non-Continuous...... Media Type
Direct Thermal...... Print Method
19200............... Baud
8................... Data Bits
None................ Parity
2................... Stop Bits
XON/XOFF............ Handshake
None................ Protocol
2CH................. Delimiter
5EH................. Format Prefix
7EH................. Control Prefix
000................. Network ID
C................... Modes Enabled
.................... Modes Disabled
 832 8/mm  Full..... Resolution
Default............. Backfeed
+00................. Label Top
+0000............... Left Position
.................... Option Card ID
.................... Socket 1 ID
VX.X.X  ............ Firmware
V2.X ............... Boot Rom
Customized.......... Configuration
0512k............... Memory
None................ B: Memory
Installed........... E: Memory
15.00............... Battery Voltage
Calibrate........... Media Power Up
Calibrate........... Media Head Close

FIRMWARE IN THIS PRINTER IS COPYRIGHTED
```

Figure 27

```
^FS^F0394,25^AA
5E 46 53 5E 46 4F 33 39 34 2C 32 35 5E 41 41

N,18,10^FD(0000
4E 2C 31 38 2C 31 30 5E 46 44 28 30 30 30 30

)999-9999^FS
29 39 39 39 2D 39 39 39 39 5E 46 53 0D 0A

^F00,50^AAN,18,
5E 46 4F 30 2C 35 30 5E 41 41 4E 2C 31 38 2C

10^FDCENTER STA
31 30 5E 46 44 43 45 4E 54 45 52 20 53 54 41
```

Figure 28

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Feed Button Modes

Power Off Mode (Communications Diagnostics Mode)	
With the printer power off, press and hold the Feed button while you turn on the power. The printer prints out a listing of its current configuration (see Figure 27). After printing the label, the printer will automatically enter a diagnostic mode in which the printer prints out a literal representation (see Figure 28) of all data subsequently received.	
Power On Modes	
With the printer power on, printhead closed, and Error LED off, press and hold the Feed button for several seconds. The Error LED will flash a number of times in sequence. The explanation at the right (Action) shows what happens when you release the key after the specific number of flashes.	
Flash Sequence	**Action**
*	A configuration label prints.
* **	The media sensor calibrates and a media sensor profile prints (see *Calibration* and Figure 25).
* ** ***	The serial communication parameters are reset to 9600 baud, 8 bits per character, no parity, 1 stop bit, and XON/XOFF.
* ** *** ****	Resets the factory defaults, auto calibrates, and saves settings into memory.
* ** *** **** *****	The print width is calibrating. While the Error LED rapidly flashes, a series of stacking rectangles prints on the label. When the rectangle prints to the outer edges of the label, press and release the Feed button. The label width and current communication parameters will be saved into memory.
If the Feed button is held down for six flashes and quickly released, the printer will ignore the button. For additional information, refer to the maintenance manual.	

Specifications

NOTE: *Printer specifications are subject to change without notice.*

Printing Specifications

Print Density		203 dots/inch (8 dots/mm)
Print Width		Up to 4.1″ (104 mm)
Print Speed		1.5″ or 2″ per second (38.1 mm or 50.8 mm per second)
Registration Tolerance	Horizontal	+/- 0.059″ (+/- 1.5 mm)
	Vertical	✓ +/- 0.0393″ (+/- 1.0 mm) on media >2″ (50.8 mm) in height ✓ +/- 0.1180″ (+/- 3.0 mm) on media < 2″ (50.8 mm) in height *unless* they are run without backfeed
Distance from Center Print Element to Center of Label		+/- 0.0393″ (+/- 1.0 mm)
Maximum Duty Cycle		✓ Up to 18% black per batch ✓ Up to 60 linear inches of media per batch ✓ Up to four batches per hour

Ribbon Cartridge Specifications (PT400)

Ribbon Width	4.33″ (110 mm)
Ribbon Outer Diameter	.66″ (16.8 mm)

Label Specifications

Label/Tag Width		1" to 4.25" (25.4 mm to 108 mm)
Fanfold Width		3.5" to 4.25" (89 mm to 108 mm)
Label/Tag Length		0.5" to 10" (12.7 mm to 254 mm)
Interlabel Gap		.08" to .16" (.12" preferred) 2 mm to 4 mm (3 mm preferred)
Label/Tag Thickness		.0030" to .0106" (.076 mm to .269 mm)
Label Roll Size	Max. Outer Diameter	2.1" (53.3 mm)
	Inner Core	1" (25.4 mm)
Media Requirements		✓ Use Zebra-brand direct thermal or thermal transfer roll media that is outside wound. Media may be reflective (black mark) sensing or transmissive sensing, die-cut, notched, or continuous. ✓ For die-cut labels, use only full auto dies. ✓ Notched media must have a 0.5" (12.7 mm) wide x 0.094" (2.4 mm) long cutout located in the center of the roll. The reflective media black marks must be located in the center of the roll. **Minimum Black Mark Dimensions:** ✓ Mark width: 0.5" (12.7 mm) perpendicular to the edge of the media. ✓ Mark length: 0.094" (2.4 mm) parallel to the edge of the media.

Memory/Communications Specifications

ROM Memory	8 megabit flash (512 kilobyte x 16 data bit width)
RAM Memory	4 megabit DRAM (256 kilobyte x 16 data bit width)
Communications	RS-232 serial port (RJ45 connector)

Font/Bar Code Specifications

Fonts Available	✓ CG Triumvirate Bold Condensed scalable smooth ✓ Zebra fonts A, B, C, D, E, H, GS	
1D Bar Codes Available	✓ Codabar (supports ratios of 2:1 to 3:1) ✓ Code 11 ✓ Code 128/USD 8 (supports serialization in all subsets and UCC Case Codes) ✓ Code 39 (supports ratios of 2:1 to 3:1) ✓ Code 93 ✓ EAN 8/JAN 8 ✓ EAN 13/JAN 13 ✓ EAN 14/UPCA	✓ Industrial 2 of 5 ✓ Standard 2 of 5 ✓ Interleaved 2 of 5 (supports ratios of 2:1 to 3:1, Modulus 10 Check Digit) ✓ LOGMARS ✓ MSI ✓ Plessey ✓ POSTNET ✓ UPC E ✓ UPC/EAN Extensions
2D Bar Codes Available	✓ Codablock ✓ Code 49 ✓ Data Matrix ✓ MaxiCode	✓ MicroPDF417 ✓ PDF 417 ✓ QRcode
Rotation Angles	0°, 90°, 180°, and 270°	

Physical/Environmental/Electrical Specifications

Physical Size (L x W x H)		2.8" x 9.2" x 7.9"	72 mm x 233 mm x 200 mm
Weight (without battery)		3.5 lbs.	1.6 kg.
Temperature Range	Operating	32° to 104° F	0° to 40° C
	Storage (w/battery)	-22° to 122° F	-30° to 50° C
	Storage (w/o battery)	-40° to 140° F	-40° to 60° C
Relative Humidity	Operation	10% to 90% (non-condensing)	
	Storage	5% to 95% (non-condensing)	
Electrical		External 120 or 230 VAC battery charger, depending on which model you order. Additional custom line cords may also be available.	

Agency Approvals

- UL 544 Medical Equipment Standard Part 42.5
- CSA 22.2 number 950 Canadian Safety Standard
- IEC 950/EN 60950 International Safety Standard
- FCC Part 15 Subpart B Class B Electromagnetic Radiation Standard
- UL 1950 Domestic Safety Standard
- Canadian DOC Class A
- SOR/88-475 Canadian Electromagnetic Radiation Standard
- EN50082-1 International Immunity Standard
- EN55022 Class B European Electromagnetic Radiation Standard

Options

- Hand/shoulder strap
- Adjustable shoulder strap
- Weather-resistant protective case
- Vibration mount, U-arm bracket, and media catch tray
- Standard battery
- Extended life battery
- 120 VAC battery charger
- Universal switching battery charger
- Battery eliminator
- Data cables

For details, call your authorized Zebra reseller.

9-Pin D to RJ45 Connection Table

DB-9S Connector to Null Modem Cable		RJ45 Connector to Printer
1	UNUSED	1
2	RXD →	2
3	← TXD	3
4	← DTR	4
5	GND	5
6	DSR →	6
7	← RTS	7
8	UNUSED	8
9		
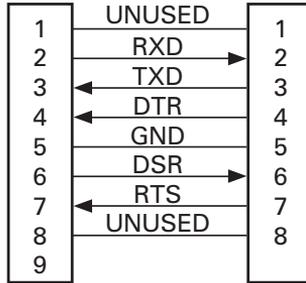
Adapter Cable Pinouts

Pin 1   Pin 8
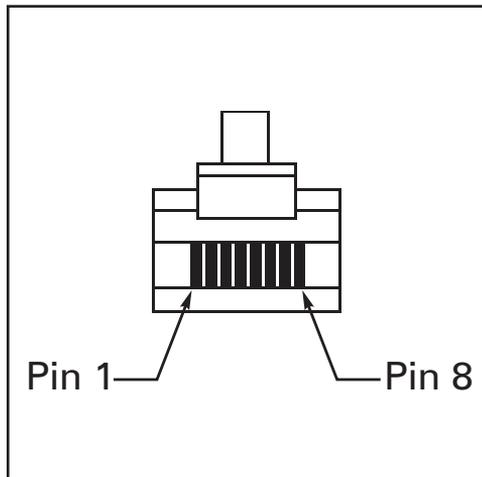
RJ45 Connector Pin Identification

25-Pin D to 9-Pin D Null Modem Cable

DB-25S
Connector
to P.C.

DB-9P
Connector
to Adapter Cable

DB-25S			DB-9P
2	TXD	DCD	1
3	RXD	RXD	2
4	RTS	TXD	3
5	CTS	DTR	4
6	DSR	GND	5
7	GND	DSR	6
8	DCD	RTS	7
20	DTR	CTS	8
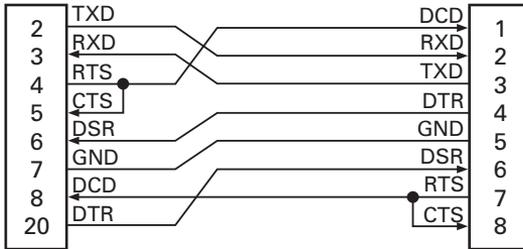
9-Pin D to 9-Pin D Null Modem Cable

DB-9S
Connector
to P.C.

DB-9P
Connector
to Adapter Cable

DB-9S			DB-9P
1	DCD	DCD	1
2	RXD	RXD	2
3	TXD	TXD	3
4	DTR	DTR	4
5	GND	GND	5
6	DSR	DSR	6
7	RTS	RTS	7
8	CTS	CTS	8
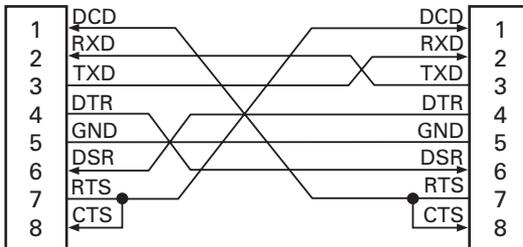
Null Modem Cable Pinouts

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